

Name: _____

Teachers for a Day: Wave Project & Presentation

4th Marking Period Project

This group project and presentation will count as the 2nd test on the “Waves” unit. Your POGIL groups (3-4 students) will apply “the basics” of waves to explain an important, real-world phenomenon involving waves. Your project will include the following parts:

1) Written answers to the guiding questions

- This needs to be typed and use your best formal English grammar, spelling and punctuation.
- Use complete sentences and answer each question completely.

2) Oral presentation

- Use a 3-5 minute group presentation to teach your classmates.
- Rehearse it first – *trust me!!*

3) Visual Aid

- Use this to help your classmates understand your main points
- Make sure the writing is large enough to see
- Include at least 2 illustrations, drawings or pictures.

*Reference all sources of information in a Bibliography. Copying from the internet = cheating. Be wise!

Group Member Names	POGIL Role
	Manager (the only group member allowed to ask the teacher questions; makes sure no one in the group is left behind)
	Note-Taker / Recorder (types the final paper)
	Artist /Presenter (Makes the visual aid & Presents project to the class; all group members will stand together)
	Reader (reads the text and materials out loud as the whole group listens)

Topic Selected: _____

You will be graded on teamwork, the final product, and your individual contribution.

Possible Points:

Individual work (50 points)	Teamwork (50 points)	Final Product (100 points)
-staying in POGIL role	-Using “right speech”	-scientific accuracy
-attendance	-sharing the work evenly	-staying within the time-limit
-doing your fair share of the work	Being a supportive, listening audience member for other teams.	-Typed report answers all the guiding questions
-staying on task	-following directions and cleaning up group work area	-attractive and informative visual aid

Presentation Topics to choose from (get teacher's approval first!):

1) The Doppler Effect (pp. 470-1, 504-505)

1. Why does the Doppler Effect only apply to sounds that are *moving*?
2. What happens to the frequency of the wave *in front of* the moving object?
3. What happens to the frequency of the wave *behind* the moving object?
4. Therefore, how does it affect the pitch of sound? (What does one hear?)
5. Therefore, how does it affect the color of light?
6. What major discovery did Hubble make due to the "red shift" of light?
7. What is "radar" and how do the police use the Doppler Effect of radio waves to catch speeders on Route 1?

2) Ultrasound & Sonar (pp. 486-7 & 497-8)

1. What is reflection?
2. Does reflection change the wavelength, frequency or speed of waves?
3. What is sonar and what does it stand for?
4. How do bats use sonar / reflection to "see" and not run into walls?
5. What *kind* of waves do bats use and what is their frequency?
6. How does the military use sonar?
7. How does an ultrasound machine work and why do pregnant women get *sonograms*?
8. Summarize the job of "sonographer"

3) Wave Interference

1. What is constructive interference?
2. What is destructive interference?
3. Make an illustration to show how noise-canceling headphones work.
4. What is resonance? How do standing waves form?
5. Can standing waves form at any wavelength? Why or why not?
6. How does a “beat” form from musical instruments?
7. What is a “node” and an “antinode”?
8. Why is it important for microwave ovens to rotate the food?

4) Vision and the Eye – How do we see color?

1. How is wavelength related to color? Do all electromagnetic waves have a “color”?
2. Illustrate and label the parts of an eye.
3. Summarize how eyes work.
4. Why do eyes focus images upside down? Why don't we really see the world like that?
5. What wavelengths of light can the human eye see?
6. When we see a leaf that is the color green, what colors of light does it absorb? Reflect?

5) Hearing and the Ear – How do we hear sound?

1. Illustrate and label the parts of the ear.
2. Summarize how ears work: what kind of wave can we hear?
3. What frequencies of sound can the human ear hear?
4. What about a wave changes for it to sound *louder*?
5. What about a wave changes for it to sound *higher pitch*?
6. Does hearing “grow back”? What parts of the ear are damaged due to hearing loss
7. Why should students be careful how loud the music they listen to

6) How do cell phones, radios & TVs work?

1. What two types of waves do cell phones use?
2. What is a “cell”?
3. What wavelengths are those waves?
4. Illustrate and label the path of waves that connects your phone with your BFF’s when you text.
5. What type of waves are changed into what other type of waves for radio broadcasts?
6. What is the difference between AM and FM radio?
7. What types of waves to television sets convert? How?
8. How is an HDTV different from ordinary TVs?

7) Waves in medicine

1. How do X-rays from the hospital work?
2. When do we use gamma rays in medicine?
3. What are the pros and cons of using x-rays and gamma rays in medicine?

8) Wave-particle duality of light: it is a particle or is it a wave? (p. 499-503)

1. What evidence do we have for light acting like a wave?
2. What evidence do we have for light acting like a particle?
3. What is wrong with each model?
4. When do we use each model?

9) Seismic Waves & Earthquakes

1. What are the 4 types of seismic waves?
 - a. Which two are transverse?
 - b. Which two are longitudinal?
 - c. Which travel the fastest?
2. Which seismic waves cannot travel through Earth's outer core because it is liquid?
3. Which waves do the most damage to buildings?
4. How is a tsunami different from a seismic wave?

- 1) The Doppler Effect (pp. 470-1, 504-505)
- 2) Ultrasound & Sonar (pp. 486-7 & 497-8)
- 3) Music & Microwaves: Wave Interference
- 4) Vision and the Eye – How do we see color?
- 5) Hearing and the Ear – How do we hear sound?
- 6) Technology: How do cell phones, radios & TVs work?
- 7) Waves in medicine: X-rays and gamma rays
- 8) Mystery: is it light a particle or a wave?
- 9) Seismic waves and earthquakes

Quads – Period 2

1. Helen, Nicole, Kiyanah,
2. Richard, Rocco, Qunital
3. Bianca, Destani, Cieda
4. Shawn, Nick, Tony, Tom O
5. Izzy, Johnny, Tom P.
6. Waala, Nate, Billy
7. Kamila, Gabby, Samantha

Period 7: